REMARKS

Upon entry of the present amendment claims 1-9 and 11-20 are pending in the application. Claims 1 and 13 have been amended in accordance with the requirements of U.S. patent practice. New claims 14-20 have been added. No new matter has been added. Support for "hydrophobic" in the amended claims can be found at least on page 5, line 27. Entry of the amendment is respectfully requested, as no new issues are raised, merely further clarification in response to the Examiner's rejection under 35 U.S.C. §112, second paragraph, explained more fully below.

Amendments to and additions to the claims, as set forth above, are made in order to streamline prosecution in this case by limiting examination and argument to certain claimed embodiments that presently are considered to be of immediate commercial significance. Amendment of the claims is not in any manner intended to, and should not be construed to, waive Applicants' right in the future to seek such unamended subject matter, or similar matter (whether in equivalent, broader, or narrower form) in the present application, and any continuation, divisional, continuation-in-part, RCE, or any other application claiming priority to or through the present application, nor in any manner to indicate an intention, expressed or implied, to surrender any equivalent to the claims as pending after such amendments.

To briefly recap, the present invention relates to new pseudoplastic aqueous dispersions. The present invention also relates to a new process for preparing pseudoplastic aqueous dispersions, also referred to as powder slurries. Powder slurries combine key advantages of liquid coating materials and powder coating materials, so making them especially advantageous. However, they can suffer from known problems. In some instances, powder slurries may undergo initial drying partly as a film instead of a powder. As a consequence of this, the popping limit in the applied films may drop below a level tolerated by the customer, since water vapor bubbles may become enclosed in the film even at comparatively low film thicknesses. On curing, in particular on thermal curing, the enclosed water in such cases is given off too late and then leads to pops and other surface defects.

Another potential problem is that clearcoats produced from powder slurries can be susceptible to blushing, i.e., the whitening of the clearcoats following moisture exposure. Specifically, in order to avoid the problem of filming during initial drying it is possible to replace the blocked aliphatic polyisocyanates by blocked cycloaliphatic polyisocyanates which raise the glass transition temperature of the dimensionally stable particles. The powder slurries in question then generally dry as powder, so that the formation of pops is avoided when the applied films in question are cured. The resultant clearcoats in some instances, however, have been found to blush following moisture exposure.

Still another potential problem is that, even when avoiding both popping and blushing by using blocked aliphatic and cycloaliphatic polyisocyanates in a balanced proportion, the chemical resistance of the clearcoats produced from the corresponding powder slurries can suffer. The chemical resistance can be raised by increasing the proportion of blocked cycloaliphatic polyisocyanate relative to blocked aliphatic polyisocyanate, but a more frequent occurrence of blushing in the clearcoat again occurs.

It has now been found that the present novel compositions and corresponding methods can avoid the above-mentioned problems. This has been demonstrated in the unexpected results shown in Table 2, on page 21, of the originally filed application, as explained more fully below. As recited in claim 1, the novel composition of the present invention is a pseudoplastic aqueous dispersion comprising solid and/or high-viscosity particles that are dimensionally stable under storage and application conditions, in dispersion in a continuous aqueous phase, wherein the dispersion also comprises at least one solid hydrophobic polyurethanepolyol, free of ionic and potentially ionic groups, comprising cycloaliphatic structural units and having a glass transition temperature greater than 15°C.

1. Rejection of claims 1 and 13 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Office Action states that Claims 1 and 13 are indefinite and fail to particularly point out and distinctly claim the subject matter which Applicants regard as the invention because the claims state, "free of ionic and potentially ionic groups." The Office Action alleges that it is

unclear what constitutes "potentially ionic," as many groups could be potentially ionic depending on how they are reacted.

This rejection is traversed for the reason that one of ordinary skill in the art would readily appreciate what "potentially ionic" means in the present context. For example, the Office Action cites US Patent No. 6,372,875 to Mayer, which states, in column 6, line 44, to column 7, line 7, that "Groups capable of forming anions are carboxyl, sulfo and/or phosphonic acid groups. It is preferred to use carboxylic acid groups…The quantity of ionizable carboxy groups available in salt form by neutralization of the carboxy groups is in general at least 0.4%…to achieve dispersability in water." See also column 3, lines 50-53, of US Patent No. 7,041,729 to Woltering et al., also cited in the Office Action. Woltering et al. also mention cation-forming groups such as amines, which can be neutralized by acids. Column 3, lines 62-65. In fact, Woltering et al. also uses the phrase "potentially ionic groups." Woltering et al. mention "ionic groups produced by neutralization of the potentially ionic groups." Abstract. Hence, it is clear that the potentially ionic groups can be measured by neutralization with KOH, and are not obtained using any indefinitely conceivable reaction as suggested by the Office Action.

The phrase "potentially ionic" is mentioned in the present specification in the following context:

> The solid polyurethanepolyol (C) is preferably hydrophobic, which is to say that in a liquid two-phase system composed of an apolar organic phase and an aqueous phase it tends to depart the aqueous phase and to collect predominantly in the organic phase. Preferably, therefore, the solid polyurethanepolyol (C) contains only a small number, if any, of pendant hydrophilic functional groups, such as (potentially) ionic groups or poly(oxyalkylene) groups.

Again, it is clear that "potentially ionic" does not depend on "how they are reacted," as proposed in the Office Action, but rather relates to the effect on hydrophilicity and dispersability, which can be adjusted by neutralization of an acid or base to the corresponding ionic salt.

In order to further clarify the meaning of "potentially ionic," Applicants have amended Claims 1 and 13 to further recite that the polyurethanepolyol (C) is hydrophobic, as defined in the specification, meaning that the polyurethanepolyol, in a liquid two-phase system composed of an apolar organic phase and an aqueous phase, tends to depart the aqueous phase and to collect predominantly in the organic phase, in addition to containing only a small number, if any, of pendant hydrophilic functional groups, such as (potentially) ionic groups or poly(oxyalkylene) groups.

2. Rejection of claims 1-9, 11-12 under 35 U.S.C. §103(a), as being unpatentable over Woltering et al. (WO 02/38685, citations based on English equivalent, US 7,041,729) in view of Mayer et al. (EP 0 708 788, citations based on English equivalent, US 6,372,875) and Ott et al.(DE 100 40 223, citations based on English equivalent, US 2003/0144413).

The Office Action states that Woltering et al. (hereafter "Woltering") teaches pseudoplastic powder clearcoat slurries comprising particles which are solid and/or high viscosity and are dimensionally stable and which further comprise as binder at least one polyol. The Office Action further states, "The binder has a minimum film forming temperature (Tg) greater than 30°C," and may be polyurethanes as described in EP 0708 788 (hereafter "Mayer"), which polyurethanes can comprise cycloaliphatic diisocyanates such as isophorone diisocyanate and dicyclohexyl diisocyanate. The Office Action alleges that a person of ordinary skill in the art would have found it obvious to use the polyurethanes as taught by Mayer in the invention of Woltering.

Applicants greatly appreciate the detailed basis of rejection but must respectfully disagree in regards to the inventions of amended independent claims 1, 13, and 14.

Applicants respectfully submit that Woltering discloses a pseudoplastic powder clearcoat slurry "free from organic solvents and external emulsifiers." [Emphasis Added.] First line of Abstract and Claim 1 of Woltering. Hence, it would seem that the Office Action is proposing to modify Woltering contrary to the explicit requirements of Woltering, in contradiction to the explicit teachings of Woltering. Woltering would not be motivated to abandon his invention in view of Mayer.

Furthermore, Woltering requires that the particles are used in dispersion with, as binder, at least one polyol with an OH number >110 mg KOH/g, containing potentially ionic groups, such that the powder clearcoat slurry has a potentially ionic group content of from 0.05 to 1 meq/g of solids. (Woltering, Abstract, emphasis added).

Woltering wishes to eliminate blushing without losing chemical resistance and, at the same time, avoid popping and other surface defects. Hence, the purpose of Woltering resembles that of the present invention. However, Woltering attempts to solve these problems in an entirely different way, by introducing potentially ionic groups in a secondary particle or polyol binder having a high OH number, in a composition free from organic solvents and external emulsifiers. Col. 2, lines 3-39. Hence, the proposed modification to Woltering would defeat the very purpose of Woltering according to Woltering. All of the Examples in Woltering provide an acid number, as a measure of the potentially ionizable groups in the polyol. It is a combination of the acid number and OH number which achieves "the object on which the present invention is based." Woltering, column 2 lines 57-65.

All the Examples in Woltering use a polyol that is an acrylic polyol, not a polyurethane polyol. As pointed out in the Office Action, however, polyurethanes are listed in Woltering, among "polyesters, alkyds, polyurethanes, polylactones, polycarbonates, polyethers, epoxy resins, epoxy resin-amine adducts, polyureas, polyamides, polyimides, polyester-polyurethanes, polyether-polyurethanes or polyester-polyether-polyurethanes." Column 4, lines 36-41. Polyurethanes are also mentioned in column 5, lines 13-16, which cites Mayer. Mayer in turn lists polyurethanes that can be made using aliphatic and/or cycloaliphatic and/or aromatic polyisocyanates. All the Examples in Mayer use aromatic polyisocyanates, i.e., tetra-methylxylene diisocyanate. Importantly, however, the combination of Mayer with Woltering still results in polyurethanes having potentially ionizable groups, contrary to the present invention.

In particular, Mayer discloses a novel process for preparing a polyurethane resin, using at least one compound containing two groups which are reactive toward isocyanate groups containing, at least in part, at least one group capable of forming anions which is neutralized before or after incorporation into the polyurethane molecule. (Mayer, abstract, emphasis added).

Mayer states that "Polyurethanes are generally incompatible with water unless specific components have been incorporated…Thus, the acid number incorporated into the polyurethane resin may be of such an extent that the neutralized product gives a stable dispersion in water." Column 6, lines 34-46. Mayer states, "The polyurethane resins prepared by means of the process according to the present invention conventionally have…an acid number of from 5 to 70 mg of KOH/g, preferably from 10 to 30 mg of KOH/g." Column 7, line 63, to column 8, line 2.

Applicants respectfully submit that Woltering and Mayer both require that the polyurethane comprises ionic and/or potentially ionic groups as discussed above. On the other hand, Applicants' independent claims recite that the polyurethane polyol is free of ionic and potentially ionic groups. Therefore, it is respectfully asserted that any modification to Woltering, the primary reference, to exclude ionic and potentially ionic groups, is not only entirely unsupported, but would render Woltering unsuitable for its intended purpose. In this regard, the courts have held that "[i]f the proposed modification would render the prior art invention being modified unsatisfactorily for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon* 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The courts have also held that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious." *In re Ratti* 270 F. 2d 810, 123 USPQ 349 (CCPA 1959).

In addition, Applicants respectfully submit that Woltering and Mayer, by requiring ionic and/or potentially ionic groups, teach away from Applicants' independent claim 1, as currently amended. A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997), emphasis added.

Further yet, although Woltering does state that it is advantageous for the binder to have a minimum film-forming temperature that is greater than 30°C, a film-forming temperature is not a transition glass temperature (T_g), as incorrectly stated in the Office Action. Col. 8, lines 42-47, of Woltering, cited in Office Action, page 3, lines 6-7. Rather, the film-forming temperature is the

temperature at which a film forms. Clearly a binder will not form a film below its T_g, but typically above its T_g.

The Office Action concedes that Woltering does not teach the polyurethanepolyol free of ionic and potentially ionic groups. The Office Action, therefore, cites Ott et al. (hereafter "Ott") for teaching pseudoplastic powdered lacquer slurries wherein "it is preferred to aim for a low level of such groups [ion-forming groups], since when the customary crosslinking agents are used, free groups of this kind remain in the film and may reduce the resistance to ambient substances and chemicals." The Office Action, therefore, states that it would have been obvious to have used external emulsifiers as taught by Ott.

Ott et al. (hereafter "Ott") cannot correct the deficiencies of Woltering any more than Mayer can. In fact, the Examiner's use of Ott is a double non sequitur. First, Woltering requires that the composition must be free of external emulsifiers. Abstract. Therefore, it does not follow that Ott teaches the use of external emulsifiers, when both Ott and Woltering state their compositions are free of external modifiers. Second, it does not follow that a reduction in ion-forming groups means that the composition is free of ion-forming groups. Rather, the ion-forming groups are still necessary in Ott, just preferably at a low level in order to improve chemical resistance. Thus, on the one hand, the Office action ignores the requirement of "being free from " (external emulsifiers), as required by both cited references (Woltering and Ott) and, on the other hand, the Office Action, reads "being free from" (ionizable groups) into Ott when Ott requires such groups, albeit preferably at relatively low levels.

Ott relates to pseudoplastic powdered lacquer slurries comprising crosslinking agents having both hard and soft segments to form a three-dimensional network. Abstract. Ott states, "In general, therefore, the chemical nature o the binder is not restrictive provided it comprises ion forming groups which are convertible by neutralization into salt groups and so are able to take on the function of ionically stabilizing the particles in water." Column 4, para. 0070. In the Examples in Ott, a polyacrylate is used having an acid no. of 43.4 mg KOH/g solid resin. Col. 7, para. 0121. Furthermore, nowhere does Ott mention the T_g (transition glass temperature) requirements of the binder.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, or knowledge generally available in the art at the time of the invention, must provide some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1998).

Applicants respectfully submit that claims 1-9 and 11-20 are patentable over the combination Woltering, Mayer, and Ott, at least because this combination does not teach or suggest all the elements of the independent claims and provides no motivation to modify its teaching to arrive at Applicants' claimed invention.

Further, the Examples in the present application show unexpectedly superior results. As shown in Table 2, on page 21, of the present specification, clearcoats according to the invention did not show blushing, was able to achieve a glossy appearance, and did not show surface defects (very good leveling and no pops), as compared to V2, without the polyurethanepolyol component, which showed surface defects and less chemical resistance. .

In view of the above, Applicants respectfully assert that claims 1-9 and 11-20 are patentable under 35 U.S.C. §103(a). Withdrawal of this rejection is respectfully requested.

3. Rejection of claim 13 under 35 U.S.C. §103(a), as being unpatentable over Woltering et al. (WO 02/38685, citations based on English equivalent, US 7,041,729) in view of Mayer et al. (EP 0 708 788, citations based on English equivalent, US 2003/0144413) and Ott et al. (DE 100 40 223, citations based on English equivalent, US 2003/0144413).

The Office Action applies, to the method claim 13, essentially the same arguments as in the above rejection of the composition claims. Applicants, therefore, respectfully assert that independent claim 13, as currently amended, is patentable over the combination of Woltering, Mayer, and Ott for at least the same reasons discussed above. Taken as a whole, it is respectfully submitted that the cited combination fails to provide the requisite motivation for a prima facie case of obviousness. Withdrawal of this rejection is respectfully requested.

NEW CLAIMS:

New claim 14 has all the limitations of claim 1 and, in addition, requires that the polyurethanepolyol in the pseudoplastic aqueous dispersion has a glass transition temperature greater than 40°C, as supported at least on page 4, line 19. Further, new claim 14 recites that the wherein the polyurethanepolyol is a product of reacting a cycloaliphatic diol, comprising cycloaliphatic structural units, with a polyisocyanate in a molar ratio such that the ratio of hydroxyl to isocyanate groups is from 1.1:1 to 2:1, as supported at least on page 7, lines 22-26, and page 6, lines 11-13.

New claim 15 recites that the polyurethanepolyol is a product of reacting both a cycloaliphatic diol and a cycloaliphatic diisocyanate which both comprise cycloaliphatic structural units, as supported at least on page 6, lines 11-13. New claim 16 requires that the polyurethanepolyol comprises at least five cycloaliphatic structural units, as supported at least on page 4, lines 21-23. New claim 17 requires that the pseudoplastic aqueous dispersion further comprises a solution polyacrylate resin, as supported at least on page 12, line 16. New claim 18 further requires that the solution polyacrylate resin comprises a repeat unit of hydroxyethyl methacrylate, as supported at least on page 12, line 24. New claim 19 further requires that the solid and/or high-viscosity particles that are dimensionally stable under storage and application conditions comprise a crosslinking agent that is a blocked polyisocyanate, as supported at least on page 13, lines 11-12. New claim 20 further requires that the particles are present in an amount of 30 to 65% by weight, based on the dispersion, as supported on page 8, lines 17-20.

CONCLUSION

Applicants respectfully submit that the Application and pending claims are patentable in view of the foregoing amendments and/or remarks. A Notice of Allowance is respectfully requested. As always, the Examiner is encouraged to contact the Undersigned by telephone if direct conversation would be helpful.

Respectfully Submitted,

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